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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.								
10/599,632	06/15/2007	Masatsugu Oishi	90606.180/ta	2053								
54071 YAMAHA C/O KEATING & BENNETT, LLP 1800 Alexander Bell Drive SUITE 200 Reston, VA 20191	7590 04/15/2010		<div>EXAMINER</div> <div>LI, JIN</div> <table border="1"><tr><td>ART UNIT</td><td>PAPER NUMBER</td></tr><tr><td>1793</td><td></td></tr></table> <table border="1"><tr><td>NOTIFICATION DATE</td><td>DELIVERY MODE</td></tr><tr><td>04/15/2010</td><td>ELECTRONIC</td></tr></table>		ART UNIT	PAPER NUMBER	1793		NOTIFICATION DATE	DELIVERY MODE	04/15/2010	ELECTRONIC
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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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### Office Action Summary

**Application No.**

10/599,632

**Applicant(s)**

OISHI ET AL.

**Examiner**

JUN LI

**Art Unit**

1793

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 04 March 2010.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 3-9, 19 and 27-32 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 3-9, 19 and 27-32 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB-08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Response to Arguments***

Applicant's responses filed on 03/04/2010 have been acknowledged and previous abstract objection has been withdrawn due to applicant's amendment.

Applicant's arguments filed on 03/04/2010 have been fully considered but they are not persuasive because the recited components in the instant claims are pure functional language which can only be enabled with CPU controlled control unit with a memory in light of the instant specification (page 26 lines 2-page 28 lines 14). Thus as long as prior art teaches such CPU controllers, the CPU controller will have the capability of performing such pure function. Christen in view of Gopal and Ichikawa teaches such CPU controllers (or computers) with memory, thus the controllers have the capability of performing such function. Furthermore, in response to applicant's arguments about Ichikawa not teaching target temperature time setting device and secondary battery, Ichikawa indicates a fuel cell needs to increase to a predetermined temperature during fuel cell activation based on detected temperature (Fig. 3, [0040-0042]) wherein a timer is provided in controller ([0053]). Ichikawa also teaches a secondary battery and its state of charge can be manipulated via a controller for determining whether to activate the fuel cell (claim 14). Christen in view of Gopal already teaches different sensors including target concentration (flow control values) can be integrated with other sensors (such as temperature etc) and controller for manipulating a desired driver application such as starting and stopping a fuel cell system as discussed above. Thus the recited target temperature raise time setting

device and secondary battery together with their relationship with memory data are just obvious modification over the applied references.

In consultation with senior examiners in fuel cell arts, the recited claims render 112 1<sup>st</sup> enablement and 112 2<sup>nd</sup> indefinite rejections which was not addressed in previous office action, thus new ground rejections based on such 112 rejections have been applied as follows.

### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

1. Claim 3-9 and 19, 27-32 are rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for a CPU programmed control circuit with memory, does not reasonably provide enablement for any other way for making and performing the recited fuel cell. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make or use the invention commensurate in scope with these claims without undue experiments. In the instant case, there is only limited examples associated with CPU programmed control circuit with memory to successfully make and operate the recited fuel cell system, while the breath of the claims include any other fuel cell system having with capability of performing the recited function but it is unclear how to make or use such fuel cell system according to the instant disclosure.

2. Claim 3-9 and 19, 27-32 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. In the instant case, 1) for the recited "input amount determining device", the fuel to be inputted to there can be based on concentration of fuel aqueous solution and fuel cell stack temperature. However, there is no description in the instant specification what algorithm or relationship between the fuel aqueous solution and fuel cell stack temperature has been used to determine the needed input fuel, there is no description of how this input fuel determining function will work probably for inputting needed fuel into the fuel cell system either. 2) furthermore, for the recited "input amount determining device", the fuel to be inputted to there can be based on concentration of fuel aqueous solution and target concentration (algorithm shown in Fig 10). There is no description of how this determining function is related to or combined to the previous input fuel determining function based on fuel aqueous solution and fuel cell stack temperature for inputting needed fuel into recited fuel cell system. 3) For the recited "target temperature raise time setting device" wherein there is a correspondence of the raise time and fuel cell stack temperature and target concentration, while the target concentration determining device determines the target concentration based on the fuel cell stack temperature and raise time, there is no clear description of whether the target temperature raise time setting device works same or vice versa as the target concentration determining device, or how these two devices

probably function or how they are related to each other. 4) There is also no enabling description of the relationship between different target concentration determining functions, i.e. the relationship of between a target concentration determining device based on the memory data and the fuel cell stack temperature (relationship shown in Fig 3) and concentration determining based on the fuel cell stack temperature and raise time. 5) There is no description of how is the function of the target concentration determining device determining target concentration based on the fuel cell stack temperature and the amount of electric charge in the secondary battery (claim 4) related to the other recited target concentration determining function based on fuel concentration and target concentration, how these two different target concentration functions are related or combined together to determine a proper target concentration for the fuel cell system. Thus one of ordinary skill in the art cannot make or use such recited fuel cell system.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claim 3-9 and 19, 27-32 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. In the instant case, the claimed apparatus are coupled with functional language instead of means for, steps for performing a specified function without the recital of structure, material or acts in

support thereof ( i.e. proper 112 6<sup>th</sup> paragraph language) . Thus it is unclear whether the recited limitations in the instant claims render 112 6<sup>th</sup> paragraph.

4. Claim 3-9 and 19, 27-32 rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential elements, such omission amounting to a gap between the elements. See MPEP § 2172.01. The omitted elements are: control circuit including a CPU for performing necessary arithmetic operations and memory for storing programs, data.

5. Claim 3-9 and 19, 27-32 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. In the instant case, 1) for the recited "input amount determining device", the fuel to be inputted there can be based on concentration of fuel aqueous solution and fuel cell stack temperature. It is unclear in the instant specification what algorithm relationship between the fuel aqueous solution and fuel cell stack temperature has been used to determine the needed input fuel, it is also unclear how this input fuel determining function will work probably for inputting needed fuel into the fuel cell system either. 2) Furthermore, for the recited "input amount determining device", the fuel to be inputted to there can be based on concentration of fuel aqueous solution and target concentration (algorithm shown in Fig 10). It is unclear how this fuel input determining function is related to or combined to the previous determining function based on fuel aqueous solution and fuel cell stack temperature for inputting needed fuel into recited fuel cell system. 3) For the recited "target temperature raise time setting device" wherein there is a correspondence of the

raise time and fuel cell stack temperature and target concentration, while the target concentration determining device determines the target concentration based on the fuel cell stack temperature and raise time, it is unclear whether the target temperature raise time setting device works same or vice versa as the target concentration determining device, or how these two devices probably function or how they are related to each other. 4) It is unclear the relationship between different target concentration determining functions, i.e. relationship between a target concentration determining device based on the memory data and the fuel cell stack temperature (relationship shown in Fig 3) and concentration determining based on the fuel cell stack temperature and raise time. 5) It is unclear how is the function of target concentration determining device determining target concentration based on the fuel cell stack temperature and the amount of electric charge in the secondary battery (claim 4) related to the other recited target concentration determining function based on fuel concentration and target concentration, how these two different target concentration functions are related or combined together to determine a proper target concentration for the fuel cell system. Thus all these renders claims indefiniteness. All the recited functioning language appears to be pure function and not corrected to structural limitation.

In light of the instant specification, these recited pure function limitations can be only be enabled with a programmable CPU control unit with memory, thus any prior art teaches such CPU control unit with memory will have capability of performing such function.



Examiner suggests applicant amended "CPU programmed to do ..." into the instant claims or amend the claim language based on 112 6th paragraph.

***Claim Rejections - 35 USC § 103***

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

**6. Claim 3 and 4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Christen (US2002/0025465) in view of Gopal (US2004/0054483) and Ichikawa (US2003/0180583).**

Christen teaches a fuel cell system comprising a fuel cell stack supplied with a fuel aqueous solution, a concentration detector ([0014]) to detect the concentration of the fuel aqueous solution, a temperature detector( item 11, Fig 1) to detect the temperature of the fuel cell stack, an input amount determining device (item 17, [0024]) to determine the amount of the fuel to be inputted to the fuel aqueous solution based on the concentration of the fuel aqueous solution and the temperature of the fuel cell stack, and an input device (item 14, 15) to input the determined amount of the fuel to the fuel aqueous solution ([0009], [0012]-[0015], [0020]-[0024], clms 1-7). Christen further discloses the fuel cell system can be used in a vehicle (i.e. transport equipment) ([0005]) and a method of operating this fuel cell system (clms 8-12).

Christen also disclose using combined concentration and temperature sensor to detect the operating medium temperature as well as the concentration ([0015]).

Regarding claim 3-5 and 19, 27, 32, Christen is silent about the recited memory, target concentration determining device, ambient temperature detector, and historical information.

Gopal teaches different sensors including reactant gas supply sensors, temperature sensors (including fuel cell environmental temperature sensors) ([0097] (Fig. 2) memory (storing different information related to different controllers for operations) ([0053], [0056]), flow control values ([0083]) for monitoring fuel cell operation based on the difference of the control value and measured value to take correct action such as stopping and restart the driver application etc ([0078], [0030], [0034], [0037], [0083], Fig 3, abstract) wherein a PID controller can be used. Gopal also teaches using a computer program product including a data processor to control the fuel cell system (claim 22).

It would have been obvious to one of ordinary skill in the art at the time of invention filed to adopt the sensors (detectors) and controllers system with computer as shown by Gopal to practice the fuel cell system of Christen because controlling different sensors such as target concentration, ambient temperature etc can help manipulate a desired driver application as shown by Gopal ([0078]).

Christen in view of Gopal is silent about the recited time setting device, a secondary battery connected to the fuel cell, and an electric charge.

Ichikawa teaches a clock (clm. 11), a battery connected to the fuel cell (Fig 1), a sensor for detecting the state of charge (SOC) of the battery (clm. 13) in a fuel cell system wherein a controller (item 33, Fig 1) estimates the energy required (needed

fuel) to activate the fuel cell (item 21) based on operating conditions at that time such as the temperature difference between the fuel cell stack and the atmosphere and the battery residual charge ([0038], [0034], [0040]-[0043],[0053] clm.14). Ichikawa also teaches fuel cell temperature is necessary to increase to a predetermined temperature during fuel cell activation where in a temperature raise timer is expected.

It would have been obvious to one of ordinary skill in the art at the time of invention filed to adopt such clock (time setting device), secondary battery, electric charge detectors as shown by Ichikawa to modify the fuel cell system because such elements can help manipulating prevent unnecessary power consumption during fuel cell activation as shown by Ichikawa (abstract, [0035]). It is also noted that Ichikawa indicates a fuel cell needs to increase to a predetermined temperature during fuel cell activation based on detected temperature while Christen in view of Gopal already teaches target concentration detector can be integrated with other sensors (such as temperature etc), controller (computer with data processor) for manipulating a desired driver (fuel cell) application as discussed above.

Regarding claim 6-9 and 28-31, Christen in view of Gopal and Ichikawa already teaches the recited information as discussed above. Furthermore, it is note that all the recited information operating method/function as recited in the instant claims cannot help making the recited fuel cell system distinct from the prior arts because similar apparatus have been disclosed thus similar function as recited will also be expected (See § MPEP 2114).

### ***Double Patenting***

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

7. Claim 3-9, 19 and 27-32 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claim 11-17 of copending Application No. 11814616. Although the conflicting claims are not identical, they are not patentably distinct from each other because the claimed subject matter is substantially overlapping with the copending application.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JUN LI whose telephone number is (571)270-5858. The examiner can normally be reached on Monday-Friday, 8:00am-5:00 pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Curtis Mayes can be reached on 571-272-1234. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/JUN LI/  
Examiner, Art Unit 1793  
03/29/2010

/Melvin Curtis Mayes/  
Supervisory Patent Examiner, Art Unit 1793

